

(19)



JAPANESE PATENT OFFICE

PATENT ABSTRACTS OF JAPAN

(11) Publication number: **2002299618 A**

(43) Date of publication of application: **11.10.02**

(51) Int. Cl. **H01L 29/78**
H01L 21/76

(21) Application number: **2001208540**

(22) Date of filing: **09.07.01**

(30) Priority: **24.01.01 JP 2001015624**

(71) Applicant: **TOYOTA CENTRAL RES & DEV
LAB INC**

(72) Inventor: **KIGAMI MASAHIITO
UESUGI TSUTOMU**

(54) **SEMICONDUCTOR DEVICE AND METHOD FOR
MANUFACTURING IT**

is suppressed sufficiently.

COPYRIGHT: (C)2002,JPO

(57) Abstract:

PROBLEM TO BE SOLVED: To lower the ON resistance of a vertical semiconductor device, to improve breakdown voltage and to lower the temperature dependency of ON resistance in addition.

SOLUTION: This vertical semiconductor device 2 is obtained by laminating a first semiconductor region 10, a second semiconductor area 12, a third semiconductor region 16 and a fourth semiconductor region 18 from the side of the front surface of the device 2. The first semiconductor region 10 and the third semiconductor region 16 are the same conductive type. The second semiconductor region 12 is an opposite conductive type. At least a pair of trenches reaching the depth of the third semiconductor region 16 or the fourth semiconductor region 18 from the surface of the device 2 are formed. A conductor 20 is formed within the trenches. The impurity concentration of at least a part of the third semiconductor region 16 is higher than that of the second semiconductor region 12. Since the impurity concentration of the third semiconductor region 16 is high, the temperature dependency of ON resistance

